

What Is Claimed Is:

1. A sensor element for determining a concentration of a gas component in a gas mixture, comprising:

a measuring gas chamber;¹³

at least one pump cell including at least one first pump electrode²⁰ situated in the measuring gas chamber and at least one second pump electrode situated on a surface of the sensor element facing the gas mixture;

a first solid electrolyte layer⁵¹ situated between the first and second pump electrodes;

a reference gas chamber;¹⁵

at least one concentration cell including at least one reference electrode^{22, 22a} situated in the reference gas chamber and at least one measuring electrode³¹ cooperating with the reference electrode and being situated in the measuring gas chamber;

a second solid electrolyte layer⁵² adjacent to the first solid electrolyte layer, in which the reference gas chamber and the measuring gas chamber are situated; and

at least one barrier layer substantially preventing ionic conduction between at least one of the electrodes of the pump cell and at least one of the electrodes of the concentration cell.

2. The sensor element according to claim 1, wherein the sensor element is for determining an oxygen concentration in an exhaust gas of an internal combustion engine.

3. The sensor element according to claim 1, wherein the barrier layer substantially prevents ionic conduction between the reference electrode and the second pump electrode.

4. The sensor element according to claim 1, wherein the barrier layer is situated in regions in a layer level of the sensor element between the reference electrode

and the ^{first?} second pump electrode.

5. The sensor element according to claim 1, wherein the barrier layer has a cutout in a region between the first and second pump electrodes. ^{or in?}

6. The sensor element according to claim 1, wherein the barrier layer has a cutout in a region between the measuring electrode and the reference electrode. ^{or in?}

7. The sensor element according to claim 1, wherein the reference gas chamber is connected to a reference gas reservoir laying outside the sensor element, with the surrounding air.

8. The sensor element according to claim 1, further comprising a layer level between the first and second solid electrolyte layers, the barrier layer being situated in regions in the layer level, the barrier layer having a cutout in a region of the first pump electrode.

9. The sensor element according to claim 8, further comprising a further reference electrode lying opposite the reference electrode in a reference gas channel, the barrier layer separating the reference electrode from the first solid electrolyte layer.

10. The sensor element according to claim 9, wherein the barrier layer is situated between a supply lead of the further reference electrode and the first solid electrolyte layer.

11. The sensor element according to claim 1, further comprising a third solid electrolyte layer, the barrier layer being situated in regions between the second and third solid electrolyte layers, the barrier layer having a cutout in a region of the measuring electrode and the reference electrode.

12. The sensor element according to claim 11, wherein the barrier layer is situated between a supply lead of the reference electrode and the third solid electrolyte layer.

12. The sensor element according to claim 11, wherein the barrier layer is situated between a supply lead of the reference electrode and the third solid electrolyte layer.